

THE MOLLUSCA OF THE ENGLISH CAVE-DEPOSITS.

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ALTHOUGH the vertebrate remains from our caves have been most assiduously collected by numerous geologists, it has apparently never occurred to them that the accompanying mollusca were of any interest whatever; and though there can be no doubt that they have been found in the numerous caverns which have been explored, more or less thoroughly, with a pickaxe, it is only on one or two occasions that their presence has been noted, and then they have been dismissed with the remark that "numerous shells of *Helix* were found in the stalagmite." This absence of record would, nevertheless, be no loss, had the specimens been preserved, which, unfortunately, has not been the case. Recently, however, through the generosity of Mrs. Pengelly, the British Museum (Natural History) has acquired, amongst other cave specimens, a small series of shells from the Happaway Cavern, near Torquay. The only published notice of them is that by the late Mr. W. Pengelly¹: "Shells of terrestrial mollusca were more numerous and varied, but those of *Helix* were the most prevalent."

The species are seven in number, viz. :—

<i>Vitrea cellaria</i> , Müll.	<i>Helix nemoralis</i> , Linn.
„ <i>alliaria</i> , Mill.	„ <i>hortensis</i> , Müll.
<i>Pyramidula rotundata</i> , Müll.	<i>Pomatias elegans</i> , Müll.
<i>Helicella caperata</i> , Mont.	

Two examples of *Vitrea lucida*, Drap. (= *V. Draparnaudi*, Beck), were also in the collection, but they are obviously from the top soil.

By far the most important cave-deposit in this country is the well-known Ightham fissure, from which such a rich harvest of vertebrate and invertebrate remains has, with infinite labour, been obtained by Mr. W. J. Lewis Abbott, F.G.S., during the past few years. In his paper describing this deposit,² seventeen species of mollusca are recorded as having been found, but since then further material has come to light, and this Mr. Abbott has very kindly placed at our disposal, a kindness for which we would take this opportunity of cordially thanking him. Twelve fresh records have thus been added, bringing the total up to twenty-nine species, viz. :—

<i>Limax maximus</i> , Linn.	<i>Vitrea cellaria</i> , Müll.
<i>Agriolimax agrestis</i> , Linn.	„ <i>fulva</i> , Drap.
<i>Vitrea crystallina</i> , Müll.	<i>Pyramidula rotundata</i> , Müll.
„ <i>alliaria</i> , Mill.	<i>Helicella ericetorum</i> , Müll.
„ <i>Helvetica</i> , Blum.	„ <i>caperata</i> , Mont.
„ <i>nitidula</i> , Drap.	<i>Hygromia hispida</i> , Linn.
„ <i>radiatula</i> , Ald.	„ <i>umbrosa</i> , Partsch.

¹ Trans. Devon Assoc., 1886, vol. xviii, p. 165.

² Quart. Journ. Geol. Soc., vol. 1, pp. 182-185.

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| <i>Vallonia pulchella</i> , Müll. | <i>Clausilia laminata</i> , Mont. |
| <i>Helicigona lapicida</i> , Linn. | <i>Cochlicopa lubrica</i> , Müll. |
| „ <i>arbusorum</i> , Linn. | <i>Cecilianella acicula</i> , Müll. |
| <i>Helix nemoralis</i> , Linn. | <i>Succinea oblonga</i> , Drap. |
| „ <i>hortensis</i> , Müll. | <i>Carychium minimum</i> , Müll. |
| <i>Pupa muscorum</i> , Linn. | <i>Pomatias elegans</i> , Müll. |
| <i>Vertigo minutissima</i> , Hart. | <i>Unio</i> , sp. |
| <i>Clausilia bidentata</i> , Ström. | |

It will at once be noticed that the species from the Devon cavern also occur at Ightham, but their number is so small that a true comparison is not possible. It is interesting, however, to note that *Pomatias elegans* and *Vitrea alliaria* are unknown from any of the other Pleistocene deposits in this country, although present in the Holocenes of Essex. In a MS. of the late Dr. S. P. Woodward, the former shell is recorded from Kent's Cavern. This is probably correct, though no examples are known to exist. Many of the shells from both localities retain some of their coloration, but the Ightham examples are by far the better preserved. This fact has been used as an argument against their presumed age. The condition of a fossil does not, however, depend on its age (the Eocene shells of the Paris Basin being noteworthy examples), and the fine preservation of these fissure shells arises from the exceptional conditions under which they were preserved.

In the Happaway Cavern, *Pomatias elegans* is the commonest form, *Vitrea cellaria* coming second, whilst *V. alliaria*, *Helicella caperata*, and *Helix hortensis* are represented by single examples only. With the Ightham shells, *Vitrea cellaria* is the most abundant, several hundred examples of all ages having passed through our hands. Its prevalence is perhaps accounted for by the fact that at the present day it is largely a cave-dweller. *Agriolimax agrestis* and *Vitrea radiatula* are only known from solitary specimens.

Vitrea Helvetica, Blum., is the British shell commonly known as *V. glabra*, Stud. We have, however, Dr. Westerlund's authority for this change of name, and there can be no doubt that our shell differs from Studer's species. Two examples have been found. It has hitherto never been recorded fossil in this country.

Hygromia umbrosa, Partsch, is by far the most noteworthy form,



Hygromia umbrosa, Partsch. × 2½.

since it has not been met with previously on this side of the Channel. Its present range is Southern Germany, Bohemia, Switzerland, Silesia,

and the Carpathians, and, according to Mörch, near Holstenborg in Denmark. In a fossil state it has only been recorded from the Middle Pleistocene of Leuben near Lommatzsch, and Robschütz near Dresden, and from the Upper Pleistocene of Weimar. Four examples have rewarded Mr. Abbott's labours, two of which are immature.

Helix nemoralis, Linn. The examples of this species are very fine, and exhibit those differences of coloration observable in recent examples. Several of the immature individuals had an open umbilicus, and in one instance this had persisted in the adult.

Carychium minimum, Müll. Two examples of this species differ so much from the type as to merit extended notice. They are much more slender in form, not exceeding .75 mm. in width, but being quite 2 mm. in height. The whorls are six in number, more closely coiled, and consequently longer, and increase more gradually all through, so



Carychium minimum, Müll., var. $\times 12$.

that the spire is higher and more tapering. The body-whorl is much less in proportion. The mouth is more rounded and not constricted at the outer tooth; on the other hand, the tooth itself is greatly reduced, and is represented by a mere thickening of the labrum. The columella-teeth are not more than one-third the size of those in recent examples, and occur far back inside the whorl, so as to be invisible when the shell is viewed obliquely. The peristome is more reflected and less thickened.

Limax maximus and *Clausilia laminata* are new records for the Pleistocene of this country, besides those already mentioned.

Unio is only represented by small fragments far too minute for specific determination.

Considerable difference of opinion still exists as to the true age of the Ightham fissure, and unfortunately the mollusca throw but little light on the question. That it is Pleistocene, is shown by the presence of *Hygromia umbrosa* and *Succinea oblonga*, as well as by the absence of all characteristic Holocene shells; but, at the same time, the almost total absence of fresh-water forms precludes a comparison with other Pleistocene deposits, in which the latter are so abundant. This absence of fresh-water mollusca has been used as an argument against the fluvial origin of the contents of the fissure; it is noteworthy, however, that the stream flowing through the valley in which it is situate contains no mollusca.

Taken altogether, the shells from our cave-deposits are decidedly larger than recent examples; and there can be no doubt that there has been a marked diminution in the size of our indigenous mollusca, and probably also in their numbers, since Pleistocene times.